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With The Editor

The "Positioning" Theory

THE well-known British medical journal, *The Lancet,* in an editorial on June 15, 1946, launches an attack against the organic method of farming and gardening. It refers to the "somewhat emotional reaction against modern agricultural methods, particularly against the use of artificial fertilizers, which are supposed to ruin the land and the crops grown on it." It states that "Lately a number of societies have sprung up to advocate the wider use of compost, a material made from animal excreta and vegetable residues, in place of artificial manures. All will sympathise with the desire of the reformers to achieve a stable agriculture and adequate health and nutrition for mankind, but it must be admitted that many of the statements made in preaching this new gospel are unacceptable both to the scientist and to the practical farmer."

Then it goes on to throw cold water on the possibility that eating food that comes from a naturally fertilized soil could be a factor in bringing about an improvement in human health. It says, "More difficult to assess is the argument that animals and man are now much more disease-ridden than formerly and that disease could be almost eliminated if we ate food grown on naturally manured soil whose flora and fauna had not been upset by artificial conditions." The *Lancet* magazine has evidently forgotten an article that appeared in its very own columns in 1940 that sings in a different key. I have the clipping before me, but it does not indicate the particular month in which it appeared. It states:

"In 1936, Dr. G. B. Chapman, of the Physical and Mental Welfare Society of New Zealand, persuaded the authorities of a boys' school hostel to grow their fruit and vegetables on soils treated with humus. This has since been done and a striking improvement is reported in general health and physique, particularly as regards freedom from infections, alimentary upsets and dental caries."

It would be most fair for the *Lancet* to have mentioned this case. The *N. Y. Times* in its issue of June 30, 1940 discussed the very same case and identified it as the Mount Albert Grammar school. The Times said, "Dr. Chapman advised that a change should be made from vegetables and fruits grown in soil fertilized by chemicals, to produce raised on soil treated only with humus. The results were startling. Catarrh, colds and influenza were greatly reduced and in the 1938 epidemic of measles, the boys had only mild attacks whereas new admissions succumbed readily."

The particular article in *The Lancet* is so full of holes that it would take an entire book to answer it, so I have decided to make it the basis for a book to be called "The Critics" which I hope to have ready for publication in the latter part of 1947. Only in that manner can I go into the detail required to demonstrate to the general public how ridiculous *The Lancet's* article really is. In the same book will be given answers to four or five other critics who would have the public believe that organic farming and garden-

ing is pure bunkum and only a passing fancy.

My purpose in writing this editorial is to discuss one point in *The Lancet's* article. It states, "Nitrogen fixed by the nitrifying bacteria of leguminous plants is apparently regarded (by some) as beneficial, but not nitrogen supplied as nitrates." Yes, we do claim that and it is the basis for the whole organicultural concept. We claim that there is all the difference in the world between sulphur and sulphur, between nitrogen and nitrogen, between potash and potash, all depending how they originated. I maintain that the sulphur in a rotten egg is as dissimilar from the sulphur in ammonium sulphate (a chemical fertilizer) as a ten-dollar bill is from a ten-dollar gold-piece. There can be no comparison between the nitrogen in the green leaf and the chemical nitrogen in the artificial fertilizer called urea, which is so powerful that it has been used for destroying weed seeds and bacteria.

In a way I want to thank *The Lancet* for running their article because it made me think along a new and extremely simple line that, I believe, has been overlooked by plant scientists. When *The Lancet* talked about "nitrogen fixed by the nitrifying bacteria," it made me try to visualize an individual bacterium, in the act of fixing some nitrogen. That bacterium is a microscopic speck and the amount of nitrogen it fixes is also a microscopic speck. Now, what separates one bacterium from another or I should rather state, what separates the one microscopic speck of nitrogen from the microscopic speck of nitrogen produced by the next bacterium? Why, the organic wall of each bacterium's body. Do you follow me? There is organic matter, therefore positioned between each speck of bacteria-produced nitrogen, which represents the body of the bacterium itself and this is a safety cushion, designed in the course of eons by Nature, to dilute the nitrogen so that it is not too strong a dose for the roots of the plant to take.

We can even go a step further. One bacterium may be separated from another by various soil substances which act as an additional buffer, in the positioning of one speck of nitrogen as against another. I offer this idea as a bit of speculation which I shall term the "positioning" theory because it stresses the importance of the distribution, dispersion or diffusion of elements. In a chemical fertilizer you may have the same element of nitrogen but it is in the pure, concentrated state. It does not have the microscopic network of the organic, dead bodies of the bacteria, interwoven minutely throughout the entire mass. The chemical in the pure state is too much of a shock to the plant. I might say then that the chemical elements in the artificial fertilizer are in a state of biological unbalance.

When we permit a green leaf to wither and decay until it becomes a powdery mass, we have in that powder a marvelous fertilizer because in that leaf, the various nutritional elements, the nitrogen, phosphorus, potash, calcium, magnesium, etc. are positioned with relation one to the other, in a safe manner. It is not within the scope of my limited space here to discuss the characteristics of the dozen or more main elements that enter into the nutrition of the plant, but I do want to bring out the fact that there is sufficient evidence to show that some of them are more or less innocuous while others are extremely dangerous.

For example there can be an oversupply of calcium and it will do no harm, but when you come to potash, sulphur, nitrogen, aluminum, etc. then watch out! This is an aspect of the question which I intend to treat in great detail in my book to be called "The Critics."

We can take another example or comparison to demonstrate an application of the "positioning" theory. There is a great deal of nitrogen in atmospheric dust which rains down on the soil. Dr. Ehrenfried Pfeiffer's

"Bio-Dynamic Farming and Gardening" states that "nitrogenous compounds rain down on England for instance at the rate of 3½ pounds per acre, and in northern France 9 pounds per acre per year." He also mentions the so-called cosmic dust and meteorites—"A significant quantity of such cosmic substances reaches the earth throughout the year." Dust, being tiny specks of earth, full of bacteria, would have its nitrogen in the safe "positioned" form.

The theory of "positioning" applies not only in the soil but also in the plant and in our bodies which are organized into billions of billions of microscopic cells. If too much of a strong element like potash would be concentrated in one part of a cell, it perhaps would mean the death of that cell. One pin-head in your liver might contain millions of cells and the death of a few of them may be relatively unimportant, but if such mortality mounts, it could create a serious, functional body disturbance. So, in the operation of the body, the proper "positioning" of elements is a significant factor.

Time Magazine, December 30, 1946, contains a paragraph that describes what goes on in a typical cell in so interesting a manner that I would like to reproduce it here. It is entitled "Simplest Life":

"The basic difference between the quick & the dead is ability to grow. Biologists feel that if they could understand growth, they might understand what life is. But growth in nature is complicated. Within a growing cell are hundreds, probably thousands of chemical compounds, their molecules weaving in & out, exchanging atoms and energy. Like a nation, the cell imports (absorbs), exports (excretes), and is influenced by its environment: the innumerable chemical substances in the plant or animal juices outside its frontiers."

From discussions with chemists and scientists I gather that there is much yet to be learned about the operation of the living cell, but I am presenting this aspect so that you can see how, in the human body as well as in the plant, the elements become disintegrated and separated into their tiniest molecular units. In organic matter, humus and composts, these elements exist already in the properly "positioned" relationships.

In studying this question I happened to think about sea-water which is supposed to contain all of the elements found in the human body and in plant tissue. I knew that this "positioning" of elements would be a factor there, otherwise, if some of the stronger elements became concentrated in one place, a fish would die if it came in contact with it. I was delightfully surprised in reading up on the subject in *The Encyclopedia Brittanica*, that it covered the same idea that has been discussed here, namely, the diffusion of the various elements in sea-water. It says, "One can look on sea-water as a mixture of very dilute solutions of particular salts (minerals), each one of which after the lapse of sufficient time fills the whole space as if the other constituents did not exist, and this interdiffusion accounts easily for the uniformity of composition in the sea-water throughout the whole ocean." For this reason it is possible that some day, sea-water might be used as a safe natural fertilizer, provided first that the excess salt and a few other elements are eliminated.

Before closing I would like to cover one more point. *The Lancet* says that an element is an element regardless where it comes from. So long as it has the same chemical symbol we need go no further. How wrong this is! Let us take the case of vitamins. The biochemists have worked out minutely the chemical formula of each vitamin. Vitamin A, no matter how produced is always made up of the same chemicals. Any chemist is in agreement on this point. Yet the *Journal of the American Medical Association*, of Sept. 25, 1937 said, "that the vitamin A which babies get from carotene or

spinach is ten times that which they can get from similar dosage (in terms of international units) of various fish liver oils." In other words a baby would need ten times the number of units of vitamin A coming from fish liver oil as against that from spinach, to accomplish the same purpose. I believe it is far worse in connection with some vitamins that are made from coal tar derivatives as against those that come directly from plant or animal matter. Check with your vitamin source if you are taking vitamins. Find out where it comes from because there is a subtle difference in the same chemicals, depending upon its source of origin.

J. I. RODALE

You Can Help The Organic Cause

You can help by handing out our subscription-getting booklets to gardeners in your community. Even neighbors, co-workers, fellow members in your church, clubs and organizations are prospects. They will thank you for giving them this booklet, for it may be the means of converting them into successful, organic gardeners. It will show them that fertile soil is the foundation of healthy crops, healthy live-stock and healthy human beings. It points out the folly and dangers of using chemical fertilizers.

You don't have to give a sales talk or make a follow-up, for the booklet in itself will induce them to subscribe. Through a coded coupon we can trace each subscription to your efforts. For this easy, spare-time activity you will receive a liberal commission.

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Write to Organic Gardening, Dept. Q., Emmaus, Pa. We will be glad to send you 25 or 50 booklets. State the amount you want.

Harnessing The Earthworm

By SIR ALBERT HOWARD, C.I.E.

AN important labour-saving discovery in the preparation of high-quality compost has just been made by Mr. J. I. Rodale, the Editor of *Organic Gardening*, at his farm near Emmaus, Pennsylvania, U.S.A. It consists in using a culture of the hybrid earthworm, originally created by the late Dr. Oliver on his experimental farm at Los Angeles, for completing the breaking down of a compost heap after the first phase of intense fermentation is over. The earthworms work downwards through the mass and quickly convert it into first-grade compost ready for distribution on the land. Two advantages are thus secured: (1) all turning of the heap is unnecessary; (2) the compost consists of ready made food materials of the very highest quality for the crop. Much labour is thereby saved: there is none of that delay which now occurs between the application of ordinary compost to the soil and its utilization by the crop.

Dr. Oliver's Hybrid Earthworm

In 1927 Dr. Oliver's attempts to combine the character of the manure worm (known everywhere as the brandling) with those of the ordinary orchard worm were made. He wished to include the characteristics of these two species in a new type. The brandling always works near the surface and deposits its castings not on the ground but near the root zones. The orchard worm, on the other hand, deposits a good deal of its castings on the surface and burrows deeply. These two species were placed in a special soil mixture made up of one-third soil, one-third vegetable humus, and one-third decayed animal matter. The worms having copulated, the egg capsules were extricated from the soil and placed in a separate container. After hatching and when the stage of maturity was approached, the weaker types were discarded and about a thousand hybrids were selected. These mated and produced fertile eggs.

After five years' intensive work on these lines a satisfactory cross was obtained which Dr. Oliver christened *Soilution*. It proved to be a prolific breeder and an active type which never deposited its castings above the surface. Most, if not all, the earthworm farms in the U.S.A. now breed and distribute this hybrid type.

Mr. Rodale has also sent me details of two of these earthworm farms which specialize in cultures of these *Soilution* worms. They are: (1) The California Earthworm Farms, 6164 North Figueroa Street, Los Angeles, California, and (2) The Ohio Earthworm Farm, Fox and Warner Lanes, Worthington, Ohio.

What is needed in this country is a full-scale demonstration of these hybrid types as labour savers in compost making, followed by the establishment of an up-to-date earthworm farm for the production of these animals for the growing army of compost gardeners and farmers in Great Britain and Eire. It would then be possible to prepare earthworm casts on a colossal scale and to provide our crops with the perfect organic manure.

Earthworms and Sheet-Composting

The conversion of the compost heap into worm casts is only one item of the work the earthworm can do. There remains the important section of sheet-composting, where a suitable

mixture of vegetable and animal wastes is converted into humus between two crops in the soil itself. For this purpose we need a soil teeming with earthworms and ample food for these creatures. In return they will help to provide our crops with plenty of perfectly balanced organic food materials, do much of our cultivation for us, besides looking after such important matters as soil aeration and drainage.

As the casts of the earthworm are particularly rich in available phosphate and potash, and also contain more soluble nitrogen than the soil from which they are derived, it might easily prove that the money now spent on artificial manures and poison sprays would be much better laid out in the provision of food and working conditions for the lowly earthworm. In time these animals are certain to be regarded as one of the most important and most contented groups of our land workers. Their method of expressing dissatisfaction with their working conditions is to go on strike —they leave the soil of the farmer or gardener high and dry to the tender mercies of the manure bag. They do not return till the prodigal comes to himself, repents and restores the humus content of his land.

Postscript: Just as this number was passed for press the results of an interesting experiment in earthworm farming—using a culture of brandlings —reached me from Mr. Charles Forman, Loddon Court, Spencer's Wood, Reading, who writes:—

'I have taken down and examined one end of the compost pile in which I had placed the brandling cultures. This pile is 10' x 5' x 2½' and has square sides as I made it inside four hurdles. I had intended to keep the depth of the pile at 36 inches but it settled down to 30. The amount of material is about 5 cubic yards. I built this pile on July 1st, introduced the worm cultures on September 3rd and took down one end of it on November 3rd. The total time involved was thus about 17½ weeks. *The worms have worked completely through the mass and worked it down very finely leaving no sign of the layers of material used in building the pile.* There is no doubt in my mind that this material will go through any make of manure distributor without clogging it, as all the fibre has either disappeared or is so short and rotted that it should give no trouble in this respect.'

Mr. Forman has been asked to prepare a detailed report on his work for the next issue of *Soil and Health*. It is certain to make interesting reading.

Town ? Garbage

Is there any town which is composting garbage?

If so let us know by writing to

Mr. J. I. Rodale, Emmaus, Pennsylvania

LAWN SUCCEEDS

Last winter I sprinkled some compost on an old lawn site that I had about given up and it developed a better lawn, despite our long drought and extreme lack of water in the well, than it had ever been before. While my neighbor's suffered for lack of moisture mine, with less sprinkling, remained a beautiful green. I also planted two Rock Roses in the compost and had another growing, without this compost, and the leaves on the composted plants were four to five times larger. It certainly pays to feed a plant instead of giving it a kick in the pants.

Dr. A. E. Irving,
Box 194,
Kelseyville, Calif.

—o—

TOMATOES IN THE MIDWEST

During the summer I had four compost piles, 4x8x4' and small as they were, I was amazed at their power. I got the best tomato seed and although a little late got a dozen plants. Carefully tended on stakes I had the most perfect fruit I have seen; not one went wrong, and in the fall I hung the little ones in the barn and later took them in the house and matured these in a window. We had the last on Dec. 12.

A. H. Walton,
18467 Brady Ave.,
Detroit 19, Mich.

—o—

TOMATOES IN THE NORTHWEST

Have composted now for 2 years and am eagerly awaiting next year with pleasure. I have 2 or 3 tons of finished compost waiting to be turned under next spring. In addition I have over a ton of raw material ready for next spring. Had wonderful results this year, with my tomatoes, in particular.

O. E. Thompson,
906 So. 9th Ave.,
Yakima, Wash.

—o—

TOMATOES IN THE EAST

I know you will be interested in the results of our tomato crop this past season, or perhaps I should say, crops; as my wife and I each had a garden.

The distance between these two gardens is about two hundred feet. My wife's garden looked far the best, with its dark, rich soil; but my garden, which was the result of one hundred tons of soil moved in on rock only two years ago, was not yet to be considered the last word in good garden soil, even though I have applied several tons of composted material to the garden. Plus the fact that the total depth of the soil was barely four inches. Nevertheless that garden, 50 by 150 feet produced a quantity of vegetables of the highest quality. But let's get back to the tomatoes. As I stated, these gardens were two hundred feet apart. The tomato plants were put in at the same time. The plants grew beautifully in both gardens, but then we heard of the blight which had begun to take its heavy toll. I was advised to spray, but was willing to run the risk as I had composted the plants heavily. My wife did not think it necessary to use any compost in her garden because of the rich soil, but spots began to appear on her tomatoes and she lost the entire crop. To my amazement, my composted plants came through with beautiful tomatoes. She canned all that she felt we could use and I gave a couple of pecks away.

H. A. Stull,
R. D. 2, Dallas, Pa.

POTATOES TOO

I was advised that I couldn't expect any potatoes because of shallow soil, but in went a bushel of whole potatoes anyway. In order to get enough depth it was necessary to cultivate a furrow of hills which left the valleys right on the rock. I planted the potatoes in the peaks and filled the row level with the peaks with compost. As they began to grow I had a farmer pay me a visit. He stated that I was certainly going to have a good crop of tops. But that was not the way they turned out. I dug four and one half bushels of beautiful Michigan Russet Potatoes, which I am told is considered excellent in view of the adverse conditions.

Howard A. Stull,
R. D. 2, Dallas, Pa.

—o—

TOMATOES GREW IN BROOKLYN

Since reading your magazine and also "Pay Dirt", I became an enthusiastic gardener with organics exclusively. I have one of the show gardens in the neighborhood right in the heart of Brooklyn.

Last summer I had the most prolific crop of tomatoes I've ever seen around here, using nothing but compost and mulches and not watering the plants once through the season. I was not bothered by blight, aphids, bugs or worms. I used no insecticide or sprays of any kind.

We are a family of four and out of 12 plants we had enough tomatoes the whole season not only for our own use, but enough to give to our neighbors, friends and relatives and canned up 36 quarts for the winter.

I can tell you a lot more about my other vegetables, but I'll leave it for another time.

Jack Greenberg,
9110 Ave. "B",
Brooklyn, N. Y.

—o—

CHICAGO GARDENER

I was reared on an Indiana farm; we were too poor to buy commercial fertilizers, so organics were the practice.

At present I live in a suburb south of Chicago; I have succeeded in turning a hard clay point into a very nice garden spot on the west end of my lot through the use of rock phosphate, bone meal, limestone, and liberal winter applications of livery stable fertilizer which has a sawdust filler.

Have composted all garbage, leaf rakings, and fall garden vinings for three years, in a compost box. At present I am experimenting with a formal compost pile—leaves, limestone, bone meal, chicken droppings, straw, and soil, also fresh horse droppings—held in place by woven wire fencing, and edged with earthworm-filled summer compost from the garbage box. I have an idea that the edging will enable the worms to work their way into the center, as the temperature of the heating manure drops off, thus helping the composting process throughout the winter.

For two years the only pests I have had in my garden were cabbage worms and early rabbits! In this particular section of the country you aren't supposed to raise sweet potatoes and Irish potatoes—they "don't do well". Last summer I raised two bushels of sweet potatoes from sixty hills; and two hundred-forty pounds of cobblers from fifteen pounds of seed.

Robert L. Grimes,
6120 S. Linder Ave.,
Chicago 38, Ill.

—o—

IMPROVEMENT OF SOIL

Perhaps you would like to hear what organic methods have done for our garden. It was very heavy clay and lay low. By tile drainage we have helped the excess water situation and by the use of compost made with chicken manure the texture has been amazingly improved. We spread the good word wherever possible and people come to see our compost heaps and so the circle widens.

(Mrs. John E.) Katherine M. Butler,
365 Maple Ave.,
Danville, Ky.

Strawberry Planting — McFarland

Strawberries

A Questionnaire Directed to Professor Geo. L. Slate, Geneva, New York

1. What is your opinion on the various methods of planting strawberries? I understand that there is some difference between planting strawberries in hills, plants 12-18 inches apart in rows about three feet distant, and planting them by the matted row system, letting the runners take up the space between the rows.—

Strawberries may be planted in several ways depending on the preference of the planter. The hill system produces somewhat larger berries than the ordinary row, and in a wet season the better air circulation around the hill plants may lessen rotting of the berries. In a dry season the hill plants have access to more soil moisture than the crowded plants of the matted row. The matted row in which all or most of the runners are allowed to root is the common method of growing strawberries and is generally preferred by commercial growers since yields are usually higher and plant costs per acre much lower. The best method is probably the matted row with the runner plants being spaced about six inches apart until the row is filled out to a width of 18-24 inches. Runner plants developed thereafter are considered weeds and removed before they take root.

2. What is the average yield of strawberries and how long will a planting be good?—

Strawberry beds if well cared for may be held for two or three crops.

Weeds must be kept down and the plants well mulched each winter. Insects and diseases may be worse in old beds, but this is not always true. In well cared for beds a higher yield of somewhat smaller berries may be obtained the second fruiting year and good yields the third year. A rough estimate is about a quart to a foot of row, but this figure will vary greatly with different varieties, rainfall and care.

3. Which is the best method of starting a new bed? How does spring planting compare with fall planting? Is it necessary to start a new bed every year?—

It is not necessary to replant each year except when certain insects are troublesome or weeds have gained the upper hand. On the average, home gardeners should get two crops from a bed. This will necessitate setting a new bed every other year. Early spring, as soon as the soil can be worked, is the best time to start a strawberry bed. August is not the best time, although many home gardeners think it is. Gardeners with very limited space can set potted plants in August after an early vegetable has been removed.

4. Is organic matter essential to success? We supply finished compost which increases the organic matter of the soil. What about manure and green manure crops plowed under?—

Strawberries thrive on organic matter and the best growers either use stable manure freely or plow under green manure crops. One of the virtues of organic matter is its moisture-holding capacity and since strawberry plants are shallow rooted this virtue becomes important in a dry season.

When stable manure is used the rate of application should be from 20 to 40 tons per acre. However, in rich garden soils where the fertility and organic matter are maintained at a high level, less manure or even none at all may be used. Twenty tons per acre is six bushels to 100 sq. ft. If a green manure crop is used more organic matter will be provided if a perennial crop such as clover or alfalfa is used and permitted to grow two or three years before turning it under than if a crop such as rye or buckwheat is grown. These crops, however, are suitable if the available land does not permit a longer rotation. The compost heap is a suitable, though laborious source of organic matter.

5. Some people think mulching is unnecessary and attracts snails. What is your recommendation as to mulching?—

Mulching strawberries is absolutely essential. Unmulched berries are usually very dirty from soil splashing on them. Then mulch keeps the berries clean, somthers some weeds and conserves moisture. The most important benefit of the mulch is the protection it provides during the winter. Unmulched beds are very apt to be seriously winter injured during the winter if the snow cover is thin or absent.

6. What are good mulch materials? How deep should plants be covered? What is the outside temperature that necessitates mulches?—

Good mulch materials are wheat straw, marsh hay and pine needles. Rye straw is less suitable. Oat straw may also be used. Three to four tons per acre or about twenty pounds to 100 sq. ft. should be used in the northern tier of states where winter temperatures approach zero. The plants should be covered to a depth of three or four inches.

7. What is the effect of mulches? How do you handle the material?—

A winter mulch should be applied where winter temperatures drop much below 20°F. The crowns may be injured by temperatures of about 18°F. and the mulch should be applied before temperatures drop any lower. The mulch is left on the bed until the crop is harvested. In the spring after the frost is out of the ground and new leaves start pushing from the crown, part of the straw is pulled off the plants and into the alley between the rows. The new leaves and flower clusters push up through the straw and the berries which develop rest on the

straw which protects them from the soil.

8. Where can the so-called "everbearing strawberries" be grown?—

Everbearing strawberries are grown principally in the northern states. I cannot find that any varieties are recommended for the South. All of the varieties I know originated in the North. It may be that cold weather is necessary to give the plants a rest period.

9. What are the best varieties for the different regions?—

Northeast: Howard (Premier), Catskill, Fairfax, Sparkle, with Pathfinder and Temple for trial.

Southeast: Blakemore, Dorsett, Fairmore, Southland.

Gulf Coast: Klonmore, Kenway, Missionary, Fairmore, Southland, Suwannee.

Prairie States: Dorsett, Fairfax, Rockhill, Howard (Premier), Catskill.

Northwest: Narcissa, Marshall, Corvallis, Rockhill.

San Francisco: Marshall, Brandywine.

Southern California: Blakemore, Marshall, Klondike.

A Question To Organic Gardeners

So many readers have discovered beneficial effects from eating food raised by the organic method on their health that we are contemplating a collection of such statements. If you have anything to contribute please send the information directly to J. I. Rodale, Emmaus, Pa. The publisher-editor of Organic Gardening, whose discoveries on neuritis and the effect of sunflower seed were more than supported by scientific testimony from medical sources, will incorporate your data in his collections for publication.

"Oh, Chestnuts!"

By DR. W. C. DEMING
Dean of American Nut Growers

WHEN I was a boy the word "chestnut" had a double meaning. If somebody told a stale, old story the cry would be, "Oh, chestnuts!" How long ago was that? Oh, maybe fifty years. Anyway, boys and girls of the rising generation don't know what you mean when you speak of chestnuts. Even the graybeards think you mean horsechestnuts. That is because of this little story: In the year 1904 Herman Merkel, Forester at the Bronx, N. Y. Zoo, noticed on some of the chestnut trees there a disease new to him. He called it to the attention of Dr. W. A. Murrill, Mycologist of the Bronx Botanical Garden, who studied it, found it a disease new to the country, and gave it a name, now Endothia parasitica. Since that time the disease has spread to the confines of the natural range of the chestnut in this country and, so far as is known, has killed every native chestnut tree. This is a tragedy probably unique in the history of plant life.

There is a curious exception to this 100% mortality. While every old tree is girdled and killed to the ground by this fungous disease, the roots are so resistant to it that they keep sending up shoots. These shoots may get to be twenty feet high before they in their turn succumb. Some of the shoots, as a result of partial girdling by the disease, will blossom and even bear a few burrs containing matured nuts. But as soon as the girdling is complete the shoot dies. Meanwhile other shoots are arising from the roots and this process goes on apparently indefinitely. Pictures of these clusters of burrs are published every fall in local newspapers as evidence that our chestnuts are "coming back". But this does not seem to be true.

The spores of the disease are carried on the claws of birds and animals and by the wind. No remedy has been found though much money has been spent. The loss to our country has been tremendous. The chestnut was our most valuable tree for telegraph poles, railroad ties and fence posts. Also it furnished lumber for many building purposes. The nuts were of less importance though still of great value.

When the many and expensive efforts to control the disease failed our agricultural authorities turned to the chestnuts of Asia for varieties that might be resistant to the blight. It was believed that it was imported on trees brought here from the Orient. So Japan and China were scouted by explorers for resistant varieties. These were found and have been growing in this country for twenty-five years and longer. Twenty-five years ago I set out a half dozen Japanese chestnut trees on a dry, gravelly hillside. Without any care whatever these trees have been bearing excellent crops annually for many years. Japanese chestnut trees are precocious and often bear in the nursery rows. The nuts are large and handsome. However the quality is generally considered inferior, though fairly good for cooking with something that adds flavor, such as sausages. The Chinese chestnuts, though not so large nor so precocious, are of better quality. For roasting, boiling or eating out of hand they are the equal of the American nut. Named and grafted varieties of both Japanese and Chinese chestnuts are

Chinese Chestnut McFarland

Chinese Chestnut McFarland

few. Naturally, named varieties have some points of superior excellence. But seedling trees are cheaper and as a rule bear good nuts, especially if grown from a selected strain. Such a strain seems to be that reported to the Northern Nut Growers Association in 1944 by E. Sam Hemming of the Eastern Shore Nurseries, Easton, Maryland, and printed in the 35th annual report of this association. He gives the production of 19 trees set in 1930 which began bearing in 1935. From 1937 to 1943 the 19 trees bore annually in pounds in round numbers, 118, 463, 564, 658, 749, a total of 2554. In 1938 and 1940 the yields were light —250 lb. in 1940. In size the nuts ran from 40 to 50 to the pound. This report should be read by every one who is seriously interested in the Chinese chestnut. (To be had from Miss Mildred Jones, P. O. Box 356, Lancaster, Pa. $1. Ask for list of accredited nut nurserymen. Free.)

The answer to the maiden nut-grower's prayer is the Japanese chestnut because it is such an early bearer, grows so fast and the nuts are so big. I have gathered a dozen that together weighed over a pound. By the time you are tired of them your Chinese chestnuts, which you should have planted at the same time, will be giving you some real flavorful nuts, like the good old sweet American chestnut that those of us that now wear white hair used to gather when we were boys and girls. They run a little bigger than the American, have the same glossy, chestnut color and the true chestnut flavor. Try them roasted, but cut away a bit of the shell first or they will explode. The Japanese chestnuts you can keep to show to your friends from the city while the Chinese nut you can keep for special purposes, such as eating yourself.

If there are any street vendors of roast chestnuts now they are using the European nuts, probably imported from Portugal in attractive, home-made, woven baskets. They used to come from Italy in barrels. Don't try planting these European nuts. The trees are very susceptible to blight, which is now attacking them in Europe. Put your trust in the Chinese variety. There are not yet enough grown to even begin to appear in the markets. What a chance for a young man with some chestnut blood in his veins! One other thing in which the Chinese is superior to the Japanese is in the thin and easily removable pellicle covering the kernel. In the Japanese it is thick and dips down into the sulci making it difficult to remove. You can buy trees grafted with named varieties if you wish. They are, of course, seedlings that the owner considers superior to the general run. Better, buy some seedlings, too, and have a chance to name a variety yourself. Besides, if some of them turn out inferior you will be tempted to learn how to graft them to better ones. This is fairly easy with chestnuts and will give you a lot of satisfaction. You will probably want to plant the first chestnuts you raise and grow some seedlings yourself.

The ideal way to get trees for planting is to take your truck, drive to the nursery of your choice, pick out in the nursery row the trees you want, have them dug under your own eyes, sprinkle the roots as soon as dug and pack them so that they cannot dry out, take them home and set them in prepared holes. I have set 200 trees in this way with the loss of one weakling. Do not set chestnut trees in wet ground. If you do they will promptly die. I know because I've done it. They like a well-drained rather gravelly loam. It is believed that the reader is familiar with the general principles of setting trees. If not follow the nurseryman's directions, always remembering that most nurserymen are loath to send a customer any tree properly pruned for setting, not because the nurseryman is ignorant but because the customer usually is?

A small proportion of the trees will be killed the first winter or two by the cold. A windbreak, or other protection will help prevent this. The trees will respond to moderate a-

mounts of manure or bagged fertilizers. Under good conditions they will reach a height of thirty to forty feet, but they will not replace the American as a timber tree. Dr. A. H. Graves, Curator of Public Instruction at the Brooklyn, N. Y. Botanical Gardens, is working on the problem of producing a blight immune or resistant chestnut tree with the timber qualities of the American tree. He has been working for this since 1932 at Mt. Carmel, Conn.

Some of the Japanese and Chinese trees may show more or less blight, but, unless they are weaklings, they will not be seriously affected. In pruning, according to general principles, it will be well to paint all cuts, even the smallest, with some protective, to minimize infections.

The nut grower's worst pest is the squirrel. Your unsophisticated squirrel will balk at a chestnut burr. But with experience he will cut a trapdoor in the free end of the burr big enough to pull all the chestnuts through. If you are going to circumvent the squirrel you will have to get up early in the morning. I beat them one year by catching eight grays in a wire trap, marking them with analine, or barbering their tails, and deporting them two miles away to the woods. I never had a return.

A friend of mine got a permit from the authorities to shoot them, and also took the precaution of using a Maxim silencer. Tender hearted ladies, which of course means all of them, will make the life of even an "authority" miserable with protests against the killing, if they get wind of it, of those "harmless and cunning little squirrels."

Chinese chestnuts should begin to bear at five or six years, Japanese a little earlier. Grafted trees should bear younger than seedlings. Some trees will be more prolific than others. Good care and resulting rapid growth will be profitable. Many people think it would be nice to have a few nut trees. So they set some and forget about them, meantime giving all their attention to the care of blooded stock. As a rule that isn't the way to get best results with exotic trees. Each of your trees needs your personal care. Even if you have a high-priced gardener very likely he will know little about nut trees.

One trait of the Chinese chestnut which I don't consider admirable, but which nevertheless is harmless, is that it holds its leaves all winter, like some of our oaks.

My suggestion, then, is to set three or more Chinese chestnuts at thirty feet or more apart in good land that is not wet. One chestnut by itself will bear few if any nuts. Two are necessary and three or more are better. If the trees are of one variety or clone, grafted trees, they will behave as one tree. They must be seedlings or different grafted varieties. See them as often as if you loved them. Sometimes you will save a tree life. If they do well you will glory in your trees.

Soil Conditions And Chemistry

"PHYSICAL CONDITIONS of the soil, especially drainage in the lower levels of the profile, appeared to be more significant than chemical properties in governing local variation in agricultural productivity", reads one of the findings of Wynd and Noggle, published in *Soil Science* 62 (1946)466.

Organic Applications In Spring

WHILE I dig my compost in at the time I do my fall spading, I have sometimes an excess over the bushel per square yard that I use in the garden every year. This I use in spring with the more demanding crops, especially tomatoes, cucumbers, watermelons, squash or pumpkin, peppers, and scarlet runner beans. The plants which grow fast, that is, the warm-weather crops which go out only after the frosty period is definitely over, can take more compost than slow-growing crops. An extra addition of nutrients supplies ample growth food which produces quick pick-up and therefore tender vegetables: In early spring, you may therefore give an extra dressing to head-lettuce. Spinach, beets, snap bush beans as well as the various members of the cabbage family, such as radish, kohlrabi, cauliflower, cabbage, savoy, Chinese cabbage, are not so demanding and can get along on smaller amounts. If you have enough compost to make another dressing, mulch around the warm-weather crops; if anything is then left over, mulch around celery and celeriac.

Speaking of root crops, I find that a top dressing of compost does not benefit them much, the exception being only the knob celery or celeriac. But even this delicious vegetable had better be given the extra compost in the planting hole or row. Its roots will even go after green matter or leaves dug under in spring. Carrots, rooted parsley, parsnip, rutabagas are much less exacting, though they do not make a very satisfactory growth if overfed with nitrogen. They respond favorably to bonemeal or rock phosphate and to potash in form of wood ashes, well dug in so that the roots do not have to forage and fork out for it. The wood ashes from the fire place that you have collected and saved in winter can now be used as a sprinkling over the garden, but may also be dug in. Bone meal, horn dust, phosphate rock or colloidal phosphate, on the other hand, should never be left on the surface, but dug in at spring spading or at least cultivated into the ground with a hoe or at least a rake, cultivator or other suitable instrument, such as a wheel-harrow. The reason for the difference in treatment is that potash fertilizers are soluble; wood ash dissolves rapidly and drains into the ground where the roots can reach it. Phosphorus, on the other hand, does not migrate much in the soil and must be put within the zone where the main roots are formed. Otherwise, the application may stay in the upper inch of the soil without doing much good to the growing-plant.

In making compost, gathering material as it accumulates, I suggest that the phosphorus fertilizer, preferably horn dust and hoof and horn meal or bone meal, the former two being also especially rich sources of nitrogen, the latter mainly of phosphorus, be added as sprinklings over the green matter. While they cannot altogether replace fresh manure, they may be suitable substitutes where manure is scarce or lacking. Of the bagged manures, especially goat, sheep, poultry and rabbit manure are valuable, since their nitrogen content is frequently higher than that of dehydrated cow manure, thus supplying the bacteria with growth food and producing better heating and breakdown of the compost material. When organic sources of phosphorus in form of bone and horn products are not available, rock and colloidal phosphate are needed. On a farm scale, they are the only ones that can be applied in sufficient quantities. All experiments have shown that rock phosphate is best when applied to the manure in the process of composting. It remains longer available or only be-

comes available when mixed with organic matter. The more alkaline the soils, the more important it is to supply rock phosphate together with organic matter.

Neither wood ashes nor phosphatic material should be used in excess. True, some vegetables thrive on ashes, especially lettuce seems to like wood ashes. But on the whole a thin sprinkling is enough. We might add in this connection that coal ashes are not recommended at all.

If you have not done fall spading which in the cold regions is always preferable because it allows the winter freezes to break up the soil particles and to untie the minerals in the soil, especially if the beds are left in the rough and not smoothed out, then spring spading is the only way out. But even then I do not recommend too fine a seed bed unless you can be sure that no major rains will follow. If they do come and hit a very smooth bed, finely raked, then the upper part will crust and make it difficult for young seedlings to push through, however much compost you may have incorporated. Compost loosens the soil, but it takes many years of composting until heavy spring rains are absorbed without forming a crust on the top.

In laying out the garden, keep also in mind that you need not sow everything at once, that it is better always to have a small bed of crisp fresh radishes and a long succession of lettuce than a sudden surplus. Also keep in mind that in July or August some crops may be sown again, for instance cabbages, turnips, rutabagas, radish, and storage crops, including beets. In the warmer regions the need for fall planting of vegetables is even greater than for spring sowing. Still, in the cooler regions with relatively short growing seasons, the two or three months between taking off spring crops and the arrival of fall frosts are important. You now want to provide for compost to dig in during the second crop season. And then you want to provide that real amount of compost which you need for spading in during the fall months when the beds become gradually cleared. This spading process starts when spinach is off and when the first radishes are harvested; it continues, as the bush beans are finished; it is followed by the beds that have yielded beets, carrots, early cabbage, etc. To provide for the large requirements of compost, make use throughout the year of all sources and build up an ample supply. Thus composting becomes part of the ordinary garden work. As you throw out refuse and gather wastes, partly for cleaning-up purposes, partly because you need compost, you do not have to encounter any great waste of time. You have to dispose of the material anyhow, you might as well have the additional plant food ready which should go into the heap.

Hoof and horn meal, cotton seed meal, cotton gin wastes, and all the other organic matter that is rich in nitrogen and usually in other fertilizer materials can sometimes be had for little; sometimes they cost considerable sums. But a bag of horn dust may contain as much as fifteen and more pounds of nitrogen, which is always costly. When you compare it with another bag, that contains perhaps 1.5 per cent of nitrogen, you may easily compute which is the less expensive source of this indispensable plant food. In this connection we should perhaps also think of the growing amount of refuse blood available from small slaughtering outfits. If this can be hauled home and put in the compost pile, it will add valuable fertility, which would be lost if it were let down the drain. But when you use it, make a heavier sprinkling of earth over your heap in order not to attract flies.

A reader recently wrote, and many others before him have said the same: "When I became compost-conscious I soon found that it wasn't so hard to get the necessary materials. Once you put your mind to it you can usually find what you want. Often at little cost. I cleaned out under a shoe-

maker's shop and hauled away hundreds of pounds of leather dust. This worked fine with my compost." Others will find other substances, but they will find them and thus put back in the land what the crops have taken out. Plan for it as the season starts and you will not only get a better garden this year, but also better soil for the future in which you will get healthier plants and more beautiful flowers in years to come.

The treatment of lawns with compost is more and more becoming the rule. Give your lawn a thin topdressing when the grass resumes active growth, and you will not only get a lusher turf, you will also get a spongier soil which retains moisture better and cuts down on watering. If compost is not available, use at least hyperhumus, possibly mixed with a thin sprinkling of chicken manure or the like. By saving leaves when you can again do so, you will furthermore improve your chances at organic gardening. The treatment of flowers with compost is a special question which we shall take up some other time. A bushel a square yard is just as good for the annuals as it is for the vegetables. But evergreens should not be given too much compost, and broad-leaved evergreens should especially not be overfed with nitrogen in any form. They thrive best with raw humus derived from raked-up leaves.

H. MEYER

When the squire's son came of age there were great rejoicings. The oldest farmer on the estate had to propose his health at the lunch, and the ancient bit of human timber thus acquitted himself:—

"Maister Garge,—Yew be just entered on man's estate. Act up to it. Doan't 'ee take no new-fangled notions about farming. Stick to taters, mangolds, and manure. That's what thy faather's made of, and look at him now!"

—o—

"How kind of you," said the girl, "to bring me those lovely flowers. They are beautiful and fresh. I believe there is some dew on them yet."

"Yes," stammered the young man in great embarrassment, "but I'm going to pay it off tomorrow."

Science Marches On

A farmer with a fine stand of hazelnut trees was bedeviled by trespassers during the nutting season. He consulted a scientific friend, and upon his advice placed at conspicuous points the following notice:

"Trespassers, take warning! All persons entering this wood do so at their own risk, for, although common snakes are not often found the Corylus Avellana abounds everywhere about here, and never gives warning of its presence."

He was troubled no more with trespassers.

(In case you don't know, Corylus Avellana is the botanical term for hazelnut.)

Wall St. Journal

Compost after being turned mechanically and stacked mechanically. Not over 15 minutes of hand work involved.

View of office, shop, implement storage in main building, garages for farm cars.

Compost pile ready for first turning. Size: 32 feet long, 7½ feet wide, and 5 feet high.

Load of corn stalks and weeds (

A Large

By MR. FRA STEAR
Stearnsington Farm, , Spe
Cl

THE Editor asked Mr. Stearns to send in a complete story of his co posting method. Mr. Stearns answered as follows:

"With your letter in mind, and because I appreciate so much the that your writings and informa have given me, we have had a pro sional photographer come over take 24 pictures. Of these we selected 10 which are being enlarg to 10 x 8 inches and will be submitted to you for choice of those which think most suitable for publishing your valuable magazine."

Among the pictures there was showing a tiller which seemed to particularly suited to large-scale age used for such garden enterp as the nursery or bulb business. asked Mr. Stearns for the make the performance of the machine received the following information:

"The tiller is a 6 foot Seaman T and is pulled by a small Caterp Tractor, and on the tiller itself stalled a six cylinder, 100 h. p., kesha engine.

weeds (g… ready for process through mill.

…arge …ng Project

A …

MR. FRA… STEARNS
…ton Farm, …w, Sperry Road
Cl…

Stearns …r year's experience with the …of his cr… it does in all kinds of stony …rns answ… …, turning under turf and etc., …s to think that if there is any …nd, and h… …ntage in incorporating organic …h the st… …into the 4 or 5 inches of the …informati… …e, as against turning over with …ad a prob… …r, this is the answer.

…e over a… …Within the last few days we have …se we ha… …into our corn fields of standing …ng enlarg… …and incorporated these stalks …e submit… …the soil and followed immediately …which y… …our team drilling in rye for cover …ublishing …

…ere was a… …There is one serious objection to …emed to … …machine, as I see it, that is its …e-scale ac… …. We are located in the midst of …enterpr… …acre farms that are run principal…usiness. … …the milk that they produce. The …e make a… …s come around to see the ma…nachine a… …in operation and are astounded …rmation: … …at it does, but when we tell them …eaman Ti… …the tiller lists at the price of $2,- …Caterp… …they are not interested. Where …itself is … …a small farmer get this much …h. p., W… …from his operations. The hour…n for doing this class of work is …

After tillage, 4-6 inches of compost are spread and tilled in about 8 inches deep.

Pile of green matter mill processed ready for layers of compost.

Three stalks of field corn 10 feet high with eight well developed ears on the three stalks.

The Early Bird

By WOODRUFF O. HOPKINS

EVERYONE has their own way of commencing to begin to start to plant vegetable seedlings for the garden. Confidentially, this is mine:

On a nice, cold late-in-the-winter evening when the wind still howls in the trees and the snow still fills the bushes and not even the boldest bud has yet pushed out I gather around me in my corner of the living room my garden books, my notebook and all my hoard of varied envelopes, scraps of paper and clippings on gardening.

The garden books include items on "How To Live in Luxury on Half an Acre", "Just Walk Out and Pick Those Big, Beautiful Vegetables" and similar gardening-made-easy tomes for the unwary householder. The notebook holds my muddled records on what last year's vegetable garden more or less looked like, where what was planted and how it made out and what I dream of planting for 1947. The envelopes and scraps carry various Great Thoughts gathered during the past season such as, "Get more manure for the cucumbers." The clippings come from papers and magazines which seem to uphold my theories on gardening but have more success at it.

After all this information has been plowed over and under and I have started drawing in the notebook some beautiful designs for that Shangri La garden of '47 I finally approach the moment which I can only describe as something like standing on the edge of what is commonly called an abyss.

It is like going up on top of the rocky cliff overlooking our creek and staring down at the house and yard and pond and trees and shrubs and garden and suddenly realizing,

"Whee, what a lot of work there is to do!"

Work stares me in the face. In fact, it leers at me!

At this point most gardeners have no alternative but really to go to gardening. But I have discovered all by myself "another important step" (which I consider a honey) to take before actually going to work. I pass it on very confidentially for what it is worth. After all, why must the early bird always HAVE to catch the worm?

This step consists in visiting all nearby neighbors, gardeners and farmers to see what they are going to do about it all. Let me assure you, kind and patient reader, that there is nothing so satisfying as sitting in a neighbor's kitchen some chilly Saturday afternoon in March over a cup of coffee and keeping him from his work while you talk over with him just the right technique for planting that flat of seedlings.

Uninitiated souls may think there is no trick at all to sticking a few seeds in the ground—but not we members of the inner circle. It takes us four or five cups of coffee to compare enough notes to get properly started. Of course, we do pick up some good ideas along with the ham sandwiches and cookies—such as the handy kink of using a kitchen flour sifter or colander to sift dirt into a flat and the new time-saving plan of using plant bands.

A greenhouse grower friend explained to me over a bottle of beer how the new-fangled things are used. Made of something like strawberry boxes, they pack flat but open up into square boxes about three to four inches deep and about two inches square. Fill your flat full of them—they cost at any seed store about two for a nickle, unless prices have gone up again. Then place in each one plant. When they

ready to go outdoors you pick up
r little box or band, the ground
und the roots of the plant is un-
turbed and you plant the box right
the garden where it gradually rots
ay. By using it and not disturbing
roots you save two to three weeks'
e in growing.

found that the old hands at using
indoors also agreed on another
t—no fertilizer in the flats. And
includes manure. The soil should
the old mixture, one third sand, one
d good soil from compost and the
third of leaf mould. Put in an
of small stones or broken pots in
bottom for drainage. On top of
add leaf mould or humus and
add two inches of the soil and
d sifted together. Smooth the soil
and firm it with a board or a
k.

y greenhouse friend was especially
atic about making sure that the
could get enough sun. He pointed
that plants always grow slowly in
ch because the sun still is low so
need as much sunlight as pos-
. Only before the plants appear
e the ground should the flat be
ewhat shaded. Furthermore, the
is the best fungicide to get rid of
great disease of indoor propaga-
—damping off. Damping off, as
all know, is a fungus or mould that
es seedlings to rot off at the
und. One old farmer urged pour-
"very hot water" on the soil be-
planting to wash out or kill the
. Another gardener said he al-
s covered his soil with a layer of
agnum moss run through a coarse
e to avoid damping off. Through
moss he plants his seed. All the
deners agreed that manure in a
ding box almost inevitably pro-
es the disease due to the bacteria
cent.

The contribution of a seed man was
advice never to let the seed dry
once it was planted. "The ground
uld be kept quite moist until the
d begins to sprout, but after that
uld be kept on the dry side," he
ised out. Germination takes place best in warmth so "bottom heat" or heat from a radiator or heater under the flat helps considerably. The ground at this time should be kept at about 72 degrees. The beds can be water-sprayed lightly with a bulb spray or some similar device so that the seeds are not disturbed.

Then it often is advisable to cover the flat with a pane of glass to keep in the moisture. However, when moisture begins to gather on the glass that is a sign that things are getting a little too damp inside and the glass should be taken off for a time. "Not too damp, but not too dry" is the formula that seedling growers follow, but so far none of them have been able to tell me exactly where that fine line goes.

As for planting, itself, there seem to be two schools of thought. The old-timers still spread the seed broadcast on the flat but the professional growers say there are more advantages to planting in rows an inch apart. Some prefer to plant two inches apart and later thin out the excess seedlings in the row. This saves further transplanting into another flat. If the ground between the rows is scratched with a knife it also aids in stopping damping off.

Florists stick to the rule in planting of covering the seed to four times its smallest diameter. They sift the covering of soil on the seed with a large screen. My grower friend recommended a window screen. My neighbor suggested the kitchen strainer or flour sifter.

There is one thing I notice that the average city gardener pays little attention to but which my old-timer friends watch closely. This is seed. There is good seed and fair seed and poor seed. Seasoned gardeners always buy their seed from the same seed house so they are reasonably sure what they are getting. Cheap seed is like a cheap fountain pen—it never works when you want it to. Not only is the seed taken from weak plants and poor varieties but mixed with it usually are the seeds of weeds as well

as pretty nearly everything under the sun, including pebbles.

Such seed often is more than a year old, too. Some seeds, of course, will germinate after two or three years but they are not reliable and should be tested. Onions, okra and parsnips are no good after one year. Beans, beets and cabbage seed may be good for as long as three or four years. However, always test any leftover seed or questionable seed. Place a counted number of seeds such as 25 or 50 between sheets of white blotting paper in a plate, moisten and cover them with another plate to check drying. In a warm room if the seed is good it will sprout in from three to six days. If it is poor it will take two weeks. If it is dead it will not appear at all. Examine the seed each day, count the sprouted ones and throw them out. Early sprouting and uniformity of sprouting indicates strong seed. Late sprouting and irregularity of sprouting indicates weak seed. If a high percentage of your seed pops up, then sow it in the soil thinly, if only a low percentage appears then sow it thickly.

A seed man in a confidential mood pointed out the other day that much experiment has shown that large seed of any variety grows stronger, sturdier plants than the small seed of the same variety, so it pays to sift out the big seeds in some cases.

That is just another of the reasons why my farmer friends and the old-time gardeners all practically sneered over the fence at me last fall when I suggested keeping my own seed for this spring. It seems that notion is for "city fellers" that do not understand how varieties get cross-bred and how pollination often fails in the average garden. They even urged me to go to special seed houses for their specialties in seed if I was really going to make my garden pay. That is the trouble with farmers, they always figure first on making their ground pay. They are never satisfied with one big, red tomato or a nice, big stalk of corn!

In planting one must estimate h long it will take each variety of p to grow. Tomatoes, peppers and e plants may be started at the beginn of March. Tomatoes, cabbage, bro coli and lettuce should be planted i doors about a week or two later. Th will enable them to be thinned an transplanted by the time they are t be set out. If plant bands are use transplant the seedlings after the fir row of leaves have appeared or as mu as they are big enough to handle. B May 15 they will be ready for th great outdoors. Of course, the date which they are planted outside ma depend on when the last killing fro usually appears in your section. As your local farm agent or state experi ment station. Tomatoes in particul cannot stand frost, so if you are of a experimental turn of mind plant ou a few early ones outdoors. Keep th majority until all normal fear of fro is past. If the season is early you w some early tomatoes but if the seaso is late you do not lose much. Better crop that is a little late than no cr at all. Remember, too, that while co weather down to freezing does not ki a plant it does stunt it. That I learn from a neighbor, too. So if your plan are out early they may be so affecte that they will produce no earlier tha those planted two weeks later—an very likely will produce less vegetable than the later planted varieties.

All of this mixed-up information o planting vegetable plants indoors, c course, applies to flowering plants a well. Only a few of these, too, ca stand cold weather. Larkspur, snap dragons and bachelor buttons (cen turia) may be set out early but i general it is much safer to take eve less chance with flowers than wi vegetables and to plant them a fe week or two weeks after the norma time for the last frost—frosts so se dom stay normal. At any rate, th same rules apply to buying seeds planting and care of flowers as t vegetable plants. And now is the tim to begin—to consult the neighbors.

Garden Calendar --- March

NORTHERN GARDENS:

Mulch material may be gradually taken off and used for composting. Where fresh manure is unavailable, get dried or dehydrated poultry, goat, sheep manure.

Heaved plants can be given a side-dressing of compost or garden earth before being pressed down. A watering won't hurt in dry weather.

Watering is often necessary when the drying March winds suck away moisture. Newly planted shrubs and trees must be kept moist, though the soil should never be water-logged. The roots need both air and water.

Flats must be sown and planted. The seed flats do not require any compost, but when the seedlings have come up and shown the first real leaf, transplant them into flats made up of a third of garden soil, compost, and sand. All vegetables can be sown now in the medium temperate region, while only tomatoes, peppers, eggplants and the summer crops are sown in the colder regions. In the warmer part of the country, the hardiest crops go out in the open by the end of the month, for instance, horseradish, Chinese cabbage, radish, rutabaga, spinach, peas.

Sweet peas, poppies, larkspurs, mignonette can be sown as soon as the soil can be worked. Calendula usually may also go out, while stock and clarkia are sown only in the warmer regions, such as Maryland. But there is no hurry.

Dormant *trees and shrubs* are planted, especially evergreens. Rubbing off undesirable buds from trees saves later pruning.

Lawns can be topdressed with compost. Ashes from the fire place, but not coal ashes, can be sprinkled on the beds. But ashes leach out badly; do it on dry days and when there is no wind.

SOUTHERN GARDENS

Summer-flowering *bulbs* can go out, also Dahlia, Dicentra, tuberous begonia, Madera Vine, Lily-of-the-Valley, etc.

In the South as well as in California *vegetable* gardening gets underway. In Southern California, for instance, beans, beets, carrots, celery, sweet corn, cucumbers, kale, kohlrabi, parsnips, late potatoes, radishes, salsify, turnips now go out first or still go out. The Northern part takes up the crops for which it is getting late in the South, for instance, asparagus, chard, cabbage, kale, kohlrabi, leek, beets, onions, parsley, peas. In Northern Florida limas, peas, radish, turnips; in Southern Florida beans, cucumbers, cantaloupes, sweet corn, summer squash, tomatoes, water melons. While limas, okra, mustard, winter squash, sweet potatoes are recommended in the South during the first half of the month, the North sets them out toward the end of March. In central Georgia, you set out broccoli plants now, in the North you seed them in the open at this time.

Crinum Powelli Alba is one of the oldest varieties and one of the best hybrids. The funnel-shaped flowers are pure white and very fragrant. It is the earliest spring bloomer and then repeats the season of bloom several times. These lilies are a charming addition to a garden.

Crinum Americanum is the native swamp lily of the South. The six petals of the white bloom are recurved and the red stamens add interest to the bloom. The foliage is more erect than many varieties of crinums. This plant has obtained a height of nearly five feet and the flower stalks usually are higher than the lily clump. It is a very old plant, taken in gardens of Marguerite Palmer.

Crinums Unto the Third and Fourth Generations

By MARGUERITE PALMER

Garden Editor, The Houston Press

PROBABLY crinums came to America in the earliest days when gardens were first planted in the colonies. If they were brought by the Pilgrims in the Mayflower, they did not survive the severe winters of the North due to the fact that they are tropical and sub-tropical plant material. From the Old World, they came with the pioneers to the Southern States and with the first families, they have grown and prospered unto the third and fourth generations. These lilies were known as "just lilies" to a great number of gardeners who have inherited them and loved them because of the heritage.

When crinoline and hoop skirts of the South passed into oblivion, crinums were beginning to lose their popularity. If they had not been hardy and almost indestructible in the South,

these lilies might have been lost and forgotten. For a number of years, they have been tucked away in the corner of the garden and in neglected locations probably due to their greedy habit of requiring a large area and refusing to behave well with blooms when they were disturbed. However today, these Cinderellas are on the horizon as popular plant material and have suddenly become the belle of the ball.

The crinum family could be compared with the Smith or the Jones family as there are a great many named varieties and types and always, some new type or hybrid coming around the corner to give a surprise. These old lilies in their massed formations are found in the old and neglected gardens, in cemeteries, in the homes of the old colored Mammy who cherished them because they came from the "big house." Even some of the industrial plants show these lilies as they were transplanted when the old homesites of pioneers had to bow to the march of industry. The evergreen and long handsome strap-like foliage has probably been the protection of these lilies from the ravages of time and often the transplanting was due to the foliage proclaiming the aristocracy of the plants.

The bulbs of these lilies grow larger with age and the roots from the bulbs penetrate deeper and deeper in the garden bed. In one garden in Houston, the same lily clump has been growing for over seventy-five years in the same location. The bulb has become so large and the roots from the bulb have grown so deeply in the soil that it is almost a Herculean task now to move the clump of lilies. There have been bulblets taken from the mother bulb without disturbing the main planting for propagation of the lilies in neighbor's gardens and in other locations of the garden. These aged clumps of lilies grow more and more profuse with bloom, often giving three seasons of blossoms.

The crinum longifolium, commonly called "capense" is the type usually grown and is nicknamed, "Milk and Wine Lily" due to the colorings of the funnel-shaped blossom which shows pure white with a pink stripe. Another hardy lily is the crinum longiflorium alba said to survive the winters of states as far north as Ohio. The crinum longifolia rosea has the same formation of blossom only the blooms are pink. The crinum longifolia is the species usually appearing in hybridization of these lilies.

Native to the South, the crinum Americanum, wins applause with its enormity of growth and showers of bloom. It has been nick-named "Swamp Lily," due to its native habitat. The star-shaped white blossom has a small line of rose down each of the six petals. These petals are narrow and recurved and the blossom is spectacular with the protruding red stamens. The long amaryllis-like leaves spread to a large area, and the clump grows tall with age, often five feet in height. Shelter from the afternoon sun is desired. Especially during the evening hours are the lilies fragrant. They are late spring bloomers and are profuse during the summer and fall if there have been frequent rains. True to their name, the lilies thrive in a rich moist soil similar to the lowland swamps.

Crinum Asiaticum is one of the species similarly in bloom to the Americanum with foliage as handsome in its formation and growth. The plant grows very large with tall flower stalks supporting the umbel which burst open with profuse blossoms. However these flowers are poorer in quality and in texture with narrow petals and they do not hold up as cut flowers although this species is recommended by many authorities as a good type. However it does bloom frequently and is fragrant.

In classifying crinums, attention should be called to the shape of the blossom as there is much variance. Some are funnel-shaped while others are almost cup-shaped resembling a tulip. Crinum Americanum and Crinum Asiaticum have such narrow

petals that usually one is impressed with the large number of blossoms more than the perfection of each individual bloom. When the heavy stalk is cut and placed in water, even the buds, which are decorative, will open as the old matured flowers are pulled off.

Texture, fragrance, color and shape of flowers are being courted by the hybridizers in obtaining new hybrids and species and varieties are being crossed to obtain these factors. The width of petals is being increased and much progress has been made in both color and texture.

The crinum kirkii is one of the most desirable lilies of the "Milk and Wine" type. The blossom is a more open funnel shaped, probably with a shorter bloom. The velvety textured blossom is white with a red center stripe. Fragrance is lacking from this variety. Many flowers open at the same time from the large umbel. Crinum kirkii and crinum Zeylanicum are so alike in bulbs that it is difficult for crinum fanciers to tell them apart. It is said that the crinum kirkii has a long neck and short thick peduncle while crinum Zeylanicum has a short neck and a long weak peduncle.

A spectacular crinum which is rated as one of the most beautiful and one of the hardiest for sub-tropical areas is crinum amabile. A delightful fragrance is given by this crinum growing an enormous size and sending forth flower stalks sometimes four feet high with twenty or thirty flowers showering from the large umbel which opens with its treasures of color. This crinum is usually described as a "sunburst." The six petals are narrower and more recurved than those of the Americanum. The color of the petals on the outer side is a wine red while the inside of the petals is white with red stripes. The upper part of the flower stalk is richly colored wine red or purple and the effect of a wine red or purple flower is given to its appearance. This lily seems to have been a favorite with the pioneers as it was planted in many of the old fashioned gardens. In Houston, some of the plantings have remained in the same locations for generations, showing that the lilies are a valuable asset to the gardens.

Crinum Moorei is another lily with a long-necked bulb, and this species and longiflorium are often used as parents of new hybrids, as both types are hardy and sturdy growers. In the South, crinum Moorei has funnel-shaped blossoms in shell pink colorings with bloom being produced in mid-summer. In other localities, the flowers are a deeper shade of pink even going into the rose shades. The crinum Moorei, similarly to many delicately colored flowers, prefer the shade in the South.

Crinum powelli and Crinum Cecil Houdyshel are both said to claim crinum Moorei and crinum longifolia for parents. Crinum powelli is an outstanding crinum bearing pure white funnel-shaped flowers in early spring. The flowers are very fragrant. This

Crinum Sanderianum of the milk and wine type is one of the oldest varieties. The petals of the bloom are wide and are white delicately lined with red through the center. The stamens are an important factor in this lily. This was pictured from a seventy-five year old clump.

lily seems to prefer the sun but will bloom in the shade. Crinum Cecil Houdyshel, named for the hybridizer and well known authority and grower of crinums, amaryllis and rare bulbs of La Verne, California, presents a funnel-shaped rose-pink flower. This crinum is considered the best pink flowering crinum, blooming in May and June and often repeating its bloom in early fall. A new powelli has come to market with a more delicate shading of pink and bears the name of crinum powelli Krelagei.

A hybrid flaunting a rich wine color, an unusual and distinctive shade for a crinum, is the crinum named Ellen Bosanquet. Blooming in mid-summer, this lily is rated as one of the loveliest. The crinum, Louis Bosanquet, blooms for a long while, bearing funnel-shaped pink flowers.

A handsome crinum belonging to the "Milk and Wine" type is crinum campanulatum, a late spring bloomer showing blush white flowers with a rose stripe. The traditional "Milk and Wine" lily of the South is named Crinum Erubscens, which comes into bloom in late summer and fall with blossoms more salver-shaped. Empress of India opens her flowers at night as a crinum of the "Milk and Wine" type. Crinum scabrum opens wide with a trumpet-shaped blossom of satiny shiny white showing a bloom of unusual fine texture with a brilliant red stripe through the center of the petals. St. Christopher, a fall bloomer, is supposed to be a rare variety of pure white with a texture most desirable for a cut flower. Crinum C. H. B. Elwes is another fall bloomer and has pink flowers of unusual beauty.

Probably the favorite of all crinums is the crinum giganteum with the unique up-right foliage and the pure white flowers, resembling tulips. Loving shade, this lily blooms profusely all September until heavy frost. The foliage, upright and somewhat wider and stiffer than the unusual strap-like and long foliage of the crinums, is usable with the crinums in flower arrangements. As a rule, crinum foliage can not be used as it bends backward at the ends with its long and supple growth.

With a wise selection, there can be succession of bloom from the crinums from very early spring to late autumn with often times, an extra blooming season added to increase their charm. Often the frequent rains and unpredictable weather can fool the crinums into the additional blooming season. This past year, crinum campanulatum, a milk and wine type with flowers blush white with petals striped with rose bloomed for three seasons during the year.

Crinums belonging to the amaryllis family have species which are native to every continent. Moorei named for Dr. Moore comes from South Africa. Some crinums are found in America, in far-away Australia, others in Asia and in Africa. The interesting fact remains that one never knows when a new crinum will be found. It is suggested that whenever a gardener sees the foliage of a crinum to inquire what type of bloom and what color. Many crinums have been growing in Southern gardens unknown and unnamed only by affectionate names such as "August Lilies," "Summer Lilies," "Milk and Wine Lilies," "St. John's Lily," "Nassau Lily" and many such names used only in certain localities.

The hybridizers have created many new lilies by crossing crinums with amaryllis for instance there is amacrinum, a delightful new bulb, and also crinodonna created by crossing Belladonna Amaryllis with the crinum. Hybridizers and crinum fanciers are interested in propagating and raising new hybrids and always on the alert to hear of new finds.

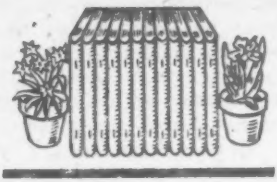
Some crinums like shade, others like sun but nearly all varieties and types prefer a deep rich loam and good drainage. The soil should be heavy sufficiently to support the weight of the plant. The bulb, in accordance with amaryllis, should have the neck and upper surface exposed. Humus and a rich sand could be combined

for the location in which the bulb is placed. A dressing of manure and bonemeal after the blooming season and again in the fall are needed in obtaining better and more blooms. Drainage should be cared for in order to keep the bulb from rotting. However do not neglect a thorough soaking when the blooming season approaches.

The seed pods are very decorative, especially so in the large and matured plantings. The seed can be planted to propagate other plants and interesting results can be obtained from these seedlings. A quicker method of propagation is to remove the growth from the mother plant. When this new offshoot has formed good top growth, then the bulblet has been sufficiently developed to become a plant of its own. However do not disturb the mother plant in the operation for these lilies do not like to be moved. Often it takes several years for a bulb to become established before the gardener is awarded with blooms.

If permanent plantings are desired, then add crinums to the garden and do not hesitate to purchase high-priced bulbs for your garden as these gardening materials will become a heritage, growing old and becoming more valuable with their age.

Crinum amabile augustum is one of the most spectacular crinums for the garden. It grows to an enormous size and often the flower stalks are four feet high and the large umbel seems to burst with twenty or thirty blooms having the six petals of each bloom colored wine on the outside and the inner side white with red stripes. The flower stalk is richly colored wine red as it develops the umbel. This lily seems to have been a favorite in the pioneer gardens of the South, and now is highly prized on account of the rich colorings.



NEW BOOKS

Please do not order these books from us. Order through a book dealer or directly from the publisher.

Montague Free, ALL ABOUT HOUSE PLANTS. (The American Garden Guild, Inc. and Doubleday and Co., Inc. 1946. Garden City, New York. $3.50)

A new book by Mr. Free always deserves special attention. The author has one of those cherished diplomas in horticulture that England bestows on the few trained in all aspects of gardening; he was, for years, the head of the Brooklyn Botanic Garden's horticulture department; and he has already written many books and articles, each one solid and reliable. This book, then, is based on experience. Whatever you may look for, you will find some guidance. Dark and colored illustrations show details and interesting plants; ample descriptions help you make sure that you choose the right plant for your needs; excellent advice on methods of potting, cultivation, temperatures, spraying etc. will assist you in getting the best from your plants; but above all, the book is well written and without the slightest affectation. Every bit of advice shows the practical man who has done these things himself with his own hands and who can therefore tell you *how* it's done. I have never cared for gardeners who go into flowery ecstasies over every little matter that most of us have known from childhood; but even those who have not grown up with house plants can now get started successfully, for Mr. Free gives facts not words. Very highly recommended. And an excellent piece of bookmaking for the price!

M. Walter Pesman, MEET THE NATIVES. An Easy Way To Recognize Rocky Mountain Wildflowers, Trees, and Shrubs. Third edition. (Pesman, 372 South Humboldt St., Denver, Colo.)

Rarely can one praise a guide to wild flowers, because most of these helps do not inform the inexperienced plant lover. But Mr. Pesman, who is a landscape architect, has attempted to show the casual wanderer what different plants might be. He arranges the mass of plants accordingly as to *regions*, from the high alpine zone to the foothills and plains. Graebner and other ecologists have used this approach for plants in other parts of the world. Then the author groups his plants according to flower colors, which are printed on different paper and therefore easy to find. You know, you are above timberline. You know the flower is white. So you look over the list and read the descriptions until you find the one before you. If it is unusual or interesting, you will notice a star that indicates an illustration. Having hiked for months over the mountains of Central and Northern Colorado and Wyoming, I was able to check this book from my own experience. It is more useful than Rydberg's Flora, it is more practical even than Clements' books. Highly recommended, even to those who live elsewhere.

Mark Keeney, COWPHILOSOPHY (Holstein-Friesian World, Lacona, New York)

This book contains the standard information on cows. It would be presumptuous for a non-dairyman like myself to take issue with the statements of an expert, but since so much in the book is excellent and reliable I think I should mention one weakness. The idea that milkwells on the udder mean anything as to yields and dairy values has been proven wrong. On the other hand, the author very wisely emphasizes the place of the dame in cattle breeding; so often only the bulls are counted upon for herd improvement. Very sound is also the attitude of this book toward calf feeding. The author emphasizes milk in the diet, when some would advise early change-over to substitutes. We are also glad to see that the writer who is, of course, a substantial dairyman himself is not eager to give grain feed to heifers. He emphasizes, however, supplements which supply missing minerals and relies on a product derived from the ocean, sea weeds and fish products, and found that the milk yield went up by about 25 per cent. And a very wise statement is that "lack of good roughage cannot entirely be overcome by any amount or character of grain feed." A worthwhile book that should be helpful to experienced dairymen as well as to those who would start the business right. Highly recommended.

Myrta

Insects and Compost

By HEINRICH MEYER

(Continued from preceding month)

II

THE studies at the University of Missouri indicated that insects attack plants which are ill balanced and either oversupplied or undersupplied with certain growth foods. The experiments were made in the laboratory where the supply of nutrients can be carefully watched and regulated.

What would happen under field conditions? It is quite obvious that here the nutrient solution cannot be controlled carefully. If, let us say, nitrate of soda was supplied shortly before seeding and then a rain came, much of the nitrogen has run off. If no rain came but a dry spell, much of it may be unavailable. If the weather is consistently cool and the crop is not growing well, because it is, like tomatoes, dependent on high night temperatures, the nitrogen in the soil may actually work as a check against growth. If all other conditions are favorable and the weather is right for the crop, let us again assume those tomatoes, the abundant nitrogen will produce a quicker growth of the plants. This may mean that the plants are then not able to keep up the corresponding uptake of other minerals and that therefore they become leggy and weak and lacking resistance when diseases strike. All of this and many other things may happen when chemicals are supplied, because it is in the nature of chemicals to be easily soluble and therefore unstable under conditions of limited control.

Let us now assume that a compost has been made, including bone meal or phosphate rock, dolomitic limestone, which supplies both calcium and magnesium, fresh unleached manure which, besides hormones etc., supplies nitrogen and a good many other nutrients, plant matter which supplies traces of most minerals present and above all potash. All of the plant nutrients are now there, but they are tied up with one another. They do not leach away quickly, they do not dissolve in the first downpour and run off. In fact, the organic matter acts as a sponge and reduces the effect of the downpour not only by holding down runoff, but also by actually storing water underground. Thus it must necessarily prolongate the effect of available plant nutrients. As the water is absorbed by the roots, they absorb with it some of the nutrients that are in the organic lumps. Everybody has seen how roots go after compost and organic matter in the soil. The plant grows more slowly, perhaps, than if given a chemical shot, but it grows healthily. It has all the necessities in the proper mixture.

How do we know? There are several good reasons for my statement. First, plants have grown before man arrived. Plants therefore must be able to forage for themselves and to get along without shots in the soil and without chemical techniques designed in laboratory and sales department. Second, plants have undergone their whole course of evolution, successfully so far, by feeding on soil minerals that were present naturally and that consisted to some extent of minerals and to some extent of organic residues, just the kind of thing compost is. We must therefore conclude that under

conditions approaching nature the plants had all the necessities for healthy survival. I like to call this the evolutionary principle of agronomy.

It is true that not all plants are adapted to the same conditions. The blueberries grow in sandy regions overlaid with marshy acid raw humus, they cannot find much nitrogen there and must therefore get along on little while the currants and gooseberries grow on limestone soils, like other members of the Saxifrage tribe. Here again, they do not find much nitrogen, but they certainly find plenty of calcium though not always much humus. The gooseberry would not survive the acidity of the bog and the blueberry would be soon overgrown and suppressed by other plants if it were moved to the limestone region and its loamy soils or stone ledges. Thus, the plants have specialized under natural conditions. Man is bringing quite a number of these plants together in his garden and has been doing so for thousands of years. He has developed strains. Or accidental proximity has produced these strains for man, who was not always a deliberate breeder, to be sure; but now the garden varieties are no longer able to shift for themselves in the wild. They cannot compete with the grasses and "weeds", they need care and cultivation.

What care and what kind of cultivation? When we grow an azalea or a blueberry bush, we must give them leaf mold or peat moss and thus simulate the conditions of nature. When we plant saxifrages in the rock garden, or gooseberries we must give them some limestone. In this way we give all plants what they mainly need. But all of them need a certain amount of the twenty-odd substances that plants seem to ask for. How should we supply those minerals? How much manganese, how much vanadium? Any uranium? Nobody could tell and not even the experts at the University of Missouri or at Cornell and in the U. S. Nutrition Lab have got beyond a few principles. What mixture should we supply to cauliflower and spinach and currants and peaches and roses and columbines and rhododendrons and tulips? Each one has some demands, though they may not all be so opposite as currants and blueberries. The gardener has no sound choice but supplying a balanced nutritional medium, that thing which scientists hate to tackle because it is so evasive and variable, compost. By supplying the various plant nutriments in organic form the gardener knows that the plant food will not be quickly soluble and that the plants will be able to get small amounts when they need it, especially so since the moisture will always be more balanced too. If he tried to supply such a balance by a chemical mixture he would have to be able to control the uptake, which is feasible in the laboratory, but not in nature. Besides, he cannot possibly make the right mixture for different plants because he does not know their needs.

Now let us return to our insect pests and see what solution we may have found for the apparent success of the compost method with pests. I do not say that the codling moth will disappear entirely by any practice man has designed. They certainly have not responded very agreeably to chemical methods so far. But there are definite signs of success.

Sir Albert Howard suggested one time the idea that insects may be the "Police Force of Nature", employed to control weakly plants. This is an ingenious thought. Of course, this is possible just as easily as the insect's assistance to plants as a pollenizing agent. Still, even without insects weakly plants rarely survive for more than a generation, because stronger plants will take over in competition. Only the plant that can uphold itself against the neighbors, either alone or in association with others, either because of its quick reproductiveness or its modest requirements or a special chemical set-up that allows it to utilize unusual conditions—only that plant will survive.

How about the insects?—They are in the same situation. Succeed or succumb, make the best or be eaten by a more successful predator or enemy. Either the aphis can eat its fill on nutritious young shoots and produce hosts of offspring before the lady bugs and other enemies take over or there will soon be no aphids left. If there is an oversupply of nitrogen, the aphis will get excellent growth food; if there is an undersupply, it will cut its growth cycle and make child marriages, as it were, to get the next generation quickly into being before succumbing itself. The aphids are quite specially equipped for quick reproduction, by the way. In other words, the aphis makes the best of either oversupply or undersupply. Similar conditions must prevail for other insects and pests. They must adapt themselves and uphold their life or die out.

Now comes compost, a balanced plant food producing a balanced plant. It does not often happen outside the garden that a plant is so well balanced. The aphis is simply not adapted to this kind of food. When a native from other countries, unaccustomed to breakfast eggs, suddenly arrives in the midst of a well-fed family, he will feel unwell. He can digest beans or hot peppers, but not bacons and eggs. When one of us gets to the hot pepper region, he will for quite a while feel unable to cope with it. What is *the* balanced diet? The aphids certainly do not know it because they have developed methods of coping with a great number of natural variations of excess or undersupply.

It is therefore likely that the insects do not grow well on compost-fed plants because they have become specialized and because they have been forced to cope with extremes of food supply. When they have a choice, they would rather pick an overfed or an underfed plant than a well-fed one. If this works to the benefit of plant life and serves an ultimate purpose in the scheme of things, so much the better for all.

This may not be the only explanation for pest-resistance of compost-grown plants, but it is the one that takes care both of the facts and the specialization of insects and plants. Compost levels out extremes and thereby serves the cultivated plants by offering them a choice, but it hurts the wild insects by giving them too good a food. This leaves us the ultimate winners, unless the insects follow suit and acquire a taste for compost-grown plants themselves. If we keep on breeding more and more resistant varieties by our methods of spraying, we will surely make life easier for the insects of the future and harder for the people that come after us.

Moreover, the decaying organic matter produces enemies to the dangerous nematode, parasites, fungi, predatory mites and nematodes, bacteria etc., all of which combine to check the growth of the pest. Thus, the seeming mystery of compost checking plant pests becomes gradually cleared up. You cannot expect results overnight, but you *can* trust the organic method for beneficial results. It has worked for a million years or longer and left us with crop plants and food for animals and men; compared with it, the rather dismal record of chemical spraying, fumigation, fertilization, etc. is insignificant, as Albert Howard often pointed out. In fact, it is quite proper to ask if chemicals have not increased our pests through the neglect of organics. They actually have bred more virulent pests. To say that beneficial agents are supported by humus methods and not by chemical methods is definitely sound in view of such research as the references have revealed.

by H. K. MEYER

Over the Fence

C. J. KING published in 1937 *A method for the control of cotton root rot* in the irrigated Southwest, S. S. D. Agric. Circular 425; he found that infested land can be brought into normal production by placing large amounts of organic matter, such as corral manure, hay or green field crops, in deep furrows in the field, covering them with five to six inches of earth, applying one irrigation immediately and one before planting. Inorganic chemical fertilizers had no effect whatsoever. He suggests that "the dense population of organisms breaking down the organic materials developed a soil condition temporarily unfavorable for the growth and activity of the root rot fungus." The untreated check plots had 56 per cent root rot, one of the treated areas only 1.6 per cent. The disastrous root rot organism was abundant on untreated plots, but all other organisms thrived better on the manured plots. This was found in Arizona and confirmed under Texas conditions by Mitchell, Hooton and Clark in 1941 and 1942. For details see U. S. Dept. of Agr. Technical Bulletin 835.

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RICHARD WEINDLING of Clemson, S. C. and the Department of Agriculture wrote an excellent Review of disease control by microbial activity in *Soil Science,* January 1946. His data confirm the teachings of Sir Albert Howard in a highly satisfactory manner. Besides the nutritional effects that organics have for growing crops, organics when properly applied quite often stimulate beneficial bacteria, as J. I. Rodale calls them, that is, organics make it possible for microbes to grow and to keep the dangerous bacteria and fungi in check. What happens in every instance nobody knows as yet, but the development of beneficial bacteria is not only the idea of the editor or Organic Gardening, but has been stated as a sound scientific hypothesis by Hildebrand and West in the *Canadian Journal of Research* and by West and Lochhead in *Soil Science* 50 (1940) 409 ff.

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CHEMICAL FERTILIZATION may ultimately lead to poor health and anemia. It was found that the necessary iron content of vegetables decreases on many soils when nitrogen is supplied. The cause is probably that nitrogen stimulates a quick growth which prevents the plant from utilizing iron in the soil to the same degree as it would if it had to forage for its nitrogen needs by extending its root system.

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HYBRIDIZING is an absorbing game; when the tulips come, you might try some breeding by the method described by Professor Oberle in his recent grape article. My father made crosses of pole beans decades ago and also got many natural hybrids between the Kentucky Wonder type and the Scarlet and White Dutch runners. When I told this to a geneticist, he expressed doubts, for he, who had never grown beans, had read that these beans are self-pollinating like many other legumes. The same has been said of peanuts. When I visited Beltsville for the first time I found Mr. Beattie shelling peanuts, but I did not ask him about them though I was quite curious. Recently I noticed a contribution by him and Mr. Kushman in the *Journal of the American Society of Agronomy* 38 (1946)

755 f. The authors say: "Natural hybridization in peanuts has always been considered as almost non-existent." Yet they mention at least seventeen natural crosses they have seen: "This suggests that natural hybridization is more common than previously suspected." Every gardener, if he only be observant, can make discoveries of this kind and increase the number of beautiful varieties.

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CAMELLIAS, that wonderful relative of the tea plant, one of the most gorgeous flowering shrubs in existence, are among the most valuable of nursery products, because they grow very slowly and must be treated with special care. One of our friends, the owner of the National Nurseries in Biloxi, Miss., reports the loss of 3000 one year old camellia plants. Since it is illegal to move uninspected nursery stock, the Federal Government is naturally quite interested in the theft. The National Nurseries have posted a reward of $1000.- for information leading to the apprehension and conviction of the guilty party. If a peddler appears with a bargain in camellias you had better call the police immediately or get in touch with the FBI. When crime invades such a pleasant field as growing camellias all well-meaning people must give support to stamp it out.

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ACID SOILS produce usually plants low in protein and essential phosphorus. We can see this, for instance, when reading the reports of LeCompte in the Connecticut Experiment Station *Bulletins* 444, 469, 478 published between 1941 and 1944 on tobacco. Tobacco deficient in phosphorus and calcium contained higher amounts of iron and manganese. When lime was added to sweeten the fields, no real all around cure was produced, but when phosphate was given for a number of years the leaves changed to the desirable light quality. Similar results would undoubtedly be obtained with other crops, for instance potatoes. In other words, liming alone may not be what is needed to improve sour land; phosphate, here easily supplied in form of ground phosphate rock (which becomes available in acid soils, even if some agriculture experts have made it unavailable in some states), should be considered for its advantageous benefits of nutritional quality.

—o—

DR. SHIELDS received considerable publicity all over the country, which shows that the nation is beginning to demand action on quality of foods. The *Pathfinder* of December 18, 1946 reported a comment by Anderson of the U. S. D. A. Plant Industry Bureau. Dr. Anderson said he believed in compost, but thought that phosphorus and nitrogen should be added. In other words, the compost which *Organic Gardening* has recommended all along is considered the best. Potassium chloride fertilizer may harmfully taint the potatoes showing up in the form of chlorine in the potato, Anderson is also reported to have said. In this connection it might be good to tell some reputable scientists, like Truog of Wisconsin, that they need not be concerned so much with the strawman they push over, called "Organics only". As far as I know, nobody has ever advocated organics only. On the contrary, everybody can find out from our writings that we constantly speak of phosphate rock, dolomite, wood ashes, and a few dozen other substances that are useful under certain conditions or in all cases. To set up ORGANICS ONLY in order to have a quick answer and to discredit this imaginary doctrine as one-sided and unscientific is about the least scientific approach imaginable. Why not deal with facts rather than try to *seem* right.

Send stamped self-addressed envelope for reply.

The Organic Gardening Farm is closed to visitors during winter. We shall announce when the visiting season resumes.

RED WOOD SHAVINGS

Q. On our property, we have large riding stables, where for some time past they have been using wood shavings, mostly redwood but some pine, for bedding down the horses.

Can you tell me if we can successfully make compost from the wood shavings from this stable operation?

C. S. O., Del Monte, Cal.

A. The wood of redwood trees seems to be much more resistant to decay than the average wood. For that reason, wood shavings may not readily decay in the compost heap. Why not try it and let us know?

—o—

COMPOST GRINDERS

Q. What experiences can you give me for purchasing a compost grinder? Is it necessary and what does it do? I have a medium-sized truck garden.

J. C. M., Long Island, N. Y.

A. On the Rodale farm a grinder was purchased and worked on an experimental basis. The results were astonishing in the rock vegetable garden. While the steer manure compost is naturally lumpy without screening, the material became finely shredded after being sent through the compost grinder and will, of course, decay more readily in the finer form which gives many bacteria a quick access. We think that a truck gardener who has frames and perhaps a greenhouse would benefit by the equipment, especially since it is a permanent investment that will last for decades. Most greenhouse men have therefore used such machines in their business for generations back.

—o—

COMPOST, WORMS, BACTERIA

Q. 1. Miss Warner in her pamphlet says to place your earthworms in "Compost" heap as you build it. J. I. Rodale says to wait 8 weeks till it cools then place your earthworms. Which is correct?

Q. 2. My weeds and manure are frozen right now. If I get a break for a warm spell will it be all right to proceed?

Q. 3. Regarding Pea seed and Bean seed inoculation, Burgess Seed Co. has a nitrogen inoculation. Mr. L. Wickenden has a preparation of nodule organism, are they the same?

F. K., Inkster, Mich.

A. In answer to your question 1, Miss Warner's way of making compost is different from that of Sir Albert Howard's. She mixes all her ingredients thoroughly; that is, mixes the manure, the green matter and puts in one third soil so that there isn't any heating to speak of, which would hurt the earthworms. In the Sir Albert Howard method, the manure is kept in a separate layer and would heat and kill or drive off the earthworms, also only thin sprinklings of earth are used. You can choose which way you like the best, but in Miss Warner's

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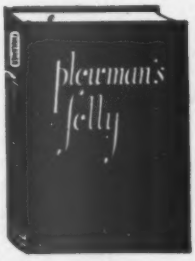

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method, you might have difficulty in getting sufficient earth.

Question 2, During warm spells in winter, it will be satisfactory to proceed with making compost.

Question 3, All of these inoculants are supposed to do the same thing. They represent bacteria.

—o—

TOBACCO CURING

Q. Please tell me how to cure tobacco. I have a very nice crop. I am only a beginner in gardening, but have forty different kinds of fruit trees. Organic Gardening is a great help. But I do not know what is to be done with the tobacco plants I have.

J. P., Willow Grove, Pa.

A. Tobacco curing on a commercial scale is a very costly project. For home consumption on the other hand, all you have to do is the following:

Hang up the bunched leaves or the whole tobacco plant in an airy dry location, for instance, a barn or an attic. It will take leaves that are mature about three to four months, stalks with leaves attached about eight months to completely dry. On a moist day when the leaves are not crumbly,

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you get them together in bundles of about 20 of equal size, tie the bundle with a leaf and put in a box in which you spray some water with an atomizer. Keep them tightly packed all the time. Inspect them if mold shows on the ribs. If that should happen, the leaves were not completely air-cured and need further drying. In the box, the leaves should not be moist but slightly damp so that the bundles can be easily handled and occasionally turned about. After about six months of curing, preferably in a room without disagreeable smells but of about 60° temperature with occasional atomizing around the box, you should get fragrant tobacco. There are many other methods of curing tobacco rapidly, but the finest fragrance such as is achieved for cigar wrappers can be obtained by the method described. The Penna. Experiment Station at State College, Pa. can probably send you a bulletin on tobacco curing.

—o—

LIME

Q. Is lime considered a chemical? What kinds of lime are used for sweetening the soil?

A. R., Fairview, N. J.

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La Verne, Calif.

A. Lime is a rock that does not contain any chemicals. It is made from ground-up limestone which also contains usually some magnesium, also necessary for feeding plants. *Ground limestone* is the best besides *ground shell lime.* Similar to it is *marl* or *ground shell marl.* If the limestone is heated, carbon dioxide is driven out and *quick lime, burned lime* or *unslaked lime* results. This is also called caustic lime. When you add water to this, it gives off heat and results in the end in *hydrated* or *slaked* lime. All of these materials are called agricultural lime and you will have to see what the bag says. Sometimes you can obtain *air slaked lime* which is quick lime that has been exposed to the air and thereby changed back to something like ground limestone except that it is in finer parts.

—o—

FARM COMPOSTING

Q. To do the most good, compost must be practical to use on a large farm. I would like some information on just how this can be accomplished. Most of the articles I've seen in your splendid magazine describe results obtained from one or two applications of compost 2 *to* 3 *inches* thick. *Now this seems impossible to accomplish on a farm.* If we were to cover an acre only 1 inch thick it would take nearly 3500 cu. ft. of compost or the product of about 8% of the pits you describe. Now what I would like to know is just *how much does an acre need and how often does it have to be applied to get good results?*

Now in applying barnyard manure tests show that best results are obtained by using 12 *to* 20 *ton per acre* once every five years. Now if we were to get better results by applying the same amount of compost we would need *the finished compost of at least two pits once every few years per acre.* I get this by figuring compost at 61 cu. ft. per ton and each pit containing better than 1000 cu. ft. Of course it would take the products of two working pits to make one pit of

finished compost. This would give me 16 ton of compost to the acre of land. Now if I had 60 acres under cultivation and made the above application once every 5 years I would have to compost 12 acres on an average every year. If it takes two pits for each acre a total of 24 pits would be needed to do the job. Now I do not know just what strength or how heavy an application is needed but if the above set of figures seems correct it would be a rather large undertaking but probably the results would more than repay the efforts. What is your opinion on the above?

H. M., Washburn, Wis.

A. Naturally, gardeners can make sufficient compost to apply it two or three inches thick, but on a farm scale when we apply compost at the rate of ten tons to the acre, you can barely see it. It isn't even consistently half an inch thick, but the soil feels it through its biologic action.

The pit idea of making compost, the way our pits are constructed, would probably apply to a farm of not over 50 acres, but on larger places, there might be batteries of pits made as shown in a recent issue of ORGANIC GARDENING. However, in England there is a machine that helps to make compost, which practically has mechanized the compost heaps, and Mr. Sykes, who has writ-

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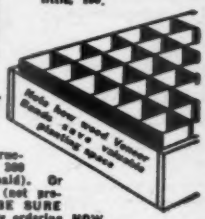

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ten for our magazine from time to time, has used it successfully for making compost for a farm of over 700 acres.

On a farm the compost is usually placed in the corn acreage and a little with a legume. In other words, as you said yourself, perhaps once in four years the land would get compost. There is much to be done yet in the way of learning to apply the "organic" method on the large scale.

—o—

SPINACH VARIETIES

Q. What are the merits of different spinach varieties?

O. K., Woodstock, Va.

A. The Truck Experiment Station of your own state has developed a blight resistant variety called *Old Dominion*, a dark green savoyed spinach that grows quick and "does not seed too early". It must, however, be sown early in spring or late in fall. All-American selections were *Noble Giant Leaved* and *Viking*, the former of light, the latter of dark color, both with only partially savoyed leaves. The standard varieties *Bloomsdale Long Standing, Reselected Bloomsdale, Extra Dark Green Bloomsdale* have, however, remained favorites. *Extra Dark Green Bloomsdale* is the darkest and slowest to seed. *Summer Savoy*, also an All-American selection, is derived from Long Standing Bloomsdale and was found to stand a few days longer without bolting. *Virginia Blight Resistant*, a savoy kind, bolts easily and should not be sown in spring, but only in fall. The same is true of the wellknown *Bloomsdale Reselected* or *Virginia Savoy*, which is blight resistant, but

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so quick growing that it should not be used except for very early or very late crops. *King of Denmark* is a long-standing variety too, with leaves resembling wild spinach varieties. *Harlem Market* is now frequently grown; you can recognize it by the turned-under leaves. It is a good variety. *Viroflay* is not much grown in the East. New Zealand Spinach is not a true spinach, but is a relative of it, which can be grown for greens during the hotter days.

—o—

BUDS IN WINTER

Q. Why are winter buds, even extremely well-developed ones like those of lilac, not destroyed by heavy frost?

W. W., Detroit, Mich.

A. Lilac buds like other buds of spring flowering shrubs are usually richer in stored materials than buds which bloom later. This material is largely in the form of starches and sugars, neither of which freezes. The little liquid that is present is so tied up with the other substances that it cannot freeze out. The cells which form the bud can, therefore, not freeze or if exposed to very cold weather will not be destroyed. The same is true of bulbs such as tulips or daffodils. The scientific term is "high-concentration". You might compare the cell sap to glycerine or alcohol or even a bag of sugar which will not freeze; whereas tea or fruit juices are not dense enough and would freeze.

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EARTHWORMS ON LAND

Q. How are earthworms used after they were bred? Which breeds are best?

A. W. H., West Elkton, Ohio

A. The method of putting earthworms in the ground is usually through the compost to which they have added or by removing half of the content of the earthworm boxes and applying it to the land, leaving the other half as a stock for further breeding. Any kind of earthworm is satisfactory for breeding and the larger kinds, nightcrawlers, manure worms, etc. do, of course, a more extensive job in breaking down organic matter into plant nutrients. On the other hand, the smaller species, the socalled hybrid earthworms, are more easily bred in boxes of medium size. Further details are discussed in the issues of O. G. of October 1946 and January 1947, by Mr. J. I. Rodale.

—o—

PEST CONTROL

Q. How do you control bean and squash bugs by organic methods?

R. S. C., New York City

A. Bean and squash bugs were completely controlled in my garden by the following method. I mixed a handful of wood ashes and a handful of hydrated lime in a sprinkling can and let it stand for a day. Then I filled a sprayer with this material, occasionally also using the sprinkling can directly and had no further trouble with the insects. I did this when I noticed the first offenders. Perhaps you could try this method.

—o—

TANNIC ACID

Q. What do you think of *Tannic Acid* as a means of acidifying the soil for acid-loving plants such as Camellias and Azaleas? Since Tannic Acid is an organic acid would this be objectionable to use?

G. E. S., New Orleans, La.

A. It is almost impossible to say what would happen if tannic acid were

incorporated in soil. Experiences with materials high in tannic acid are so contradictory as to toxic effects that the only explanation is: Tannic acid is more or less dangerous according to the type of soil to which it is added. While fungi are not necessarily destroyed by it, a number of bacteria seem to become completely eliminated. This is, by the way, the reason why we tan hides to make them into leather.

As far as I know, nobody has made any such experiments with azaleas and camellias and I would suggest that you make a trial in one pot or around one plant that is not too valuable and keep a good record of the amount you apply.

—o—

BERMUDA GRASS

Q. Could you please inform me on how I can get rid of the Bermuda grass in my garden and asparagus bed? It is important as the Bermuda is choking out the asparagus faster than I can keep it cut..

E. J., Fairhope, Ala.

A. If a Bermuda sod has formed it is necessary to either stifle the grass by heavy mulching during the active growing period of the grass or to dig it up. Bermuda, not being deep-rooted, can be controlled by mulching which causes quick rotting. Where mulching is impractical it may be wiser to make a new bed and to take care that the grass can never enter. With a sturdy trowel the grass can, however, after heavy soaking be easily removed without much exertion. I should advise doing this in the asparagus bed if you do not intend to replant asparagus.

—o—

WOODLANDS

Q. Could you tell me the name of a good book on forestry?

E. J., State College, Pa.

A. Professor Hawley of Yale just brought out a new edition of his well-

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known book *The Practice of Silviculture* (John Wiley and Sons, Inc., 440 Fourth Ave., New York City) which I can highly recommend. I also call attention to the *Gardener's Book Club* for which Professor Gifford has written three texts, the first one just published on Southern trees. A booklet on Northern Trees and a third one will follow in the next series of the Gardener's Book Club, or appear as a cloth-bound book.

—o—

BOOKS FOR THE GARDENER

Q. Where could I find out about the names and relationships of plants that we grow in the garden. I didn't know that radish and cabbage were related until you mentioned this in *Organic Gardening.*

H. M., Fort Worth, Texas

A. Two most useful books are Bailey's *Hortus Second* and Bailey's *Manual of Cultivated Plants.* The first one follows an alphabetical order, the second arranges the plants according to family relationships. Both are published by the Macmillan Company, 60 Fifth Avenue, New York City.

—o—

RASPBERRY PATCH

Q. We are thinking very much of planting a good sized raspberry patch this spring—also some strawberries—(raising them to sell) and am wondering where we can find plenty of good information in regards to raising them the "Organic Gardening" or compost way—so as to give us as high yields as possible?

Mrs. M. M., Covington, Ohio

A. You might use up to 40 tons of manure for growing these berries—no danger from over-supply. However, you can also use less at the time of

planting and add later in the form of mulch. It is good practice to follow the advice of the Experiment Station of your state as regards variety and I should write to the Experiment Station at Wooster or to State University at Columbus.

Many growers of berries have found it practical to first treat the soil carefully with cover crops which they plow under. Those were the ones who had the greatest results in crops and quality. Clover, alfalfa or even rye planted first and then plowed under will improve the organic structure sufficiently to produce good berries when manure is added. This will cut down on the manure required.

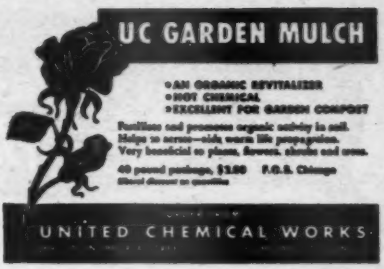
—o—

HOPS

Q. We have taken a great deal of interest in the composting in reference to the possible increase in quality of the hops. It is generally conceded the European hops have more favorable aroma. We understand that they do considerable composting in their fertilizing. Have you any information on this, or comments regarding same?

P. G., Yakima, Wash.

A. I am well acquainted with the European hop growing methods in Spalt (Franconia) which next to the Bavarian hop region, is the most prominent in Germany and second only to the hops of Bohemia. The farmers, in both regions, in the Hallertau and in Spalt, use manure from the barn, which has been weathered or composted together with the liquid manure, for about a year. This manure contains also the bedding so that about the same effect as Sir Albert Howard's compost would be produced, a mixture of plant matter and animal matter. The material is quite moist and an application of 20 tons per acre at the time of starting the hop garden is not unusual. The dressings given afterwards vary according to amounts available and to seasons.



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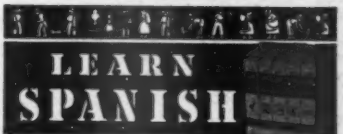

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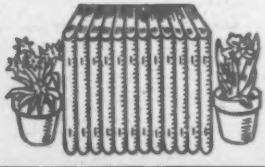

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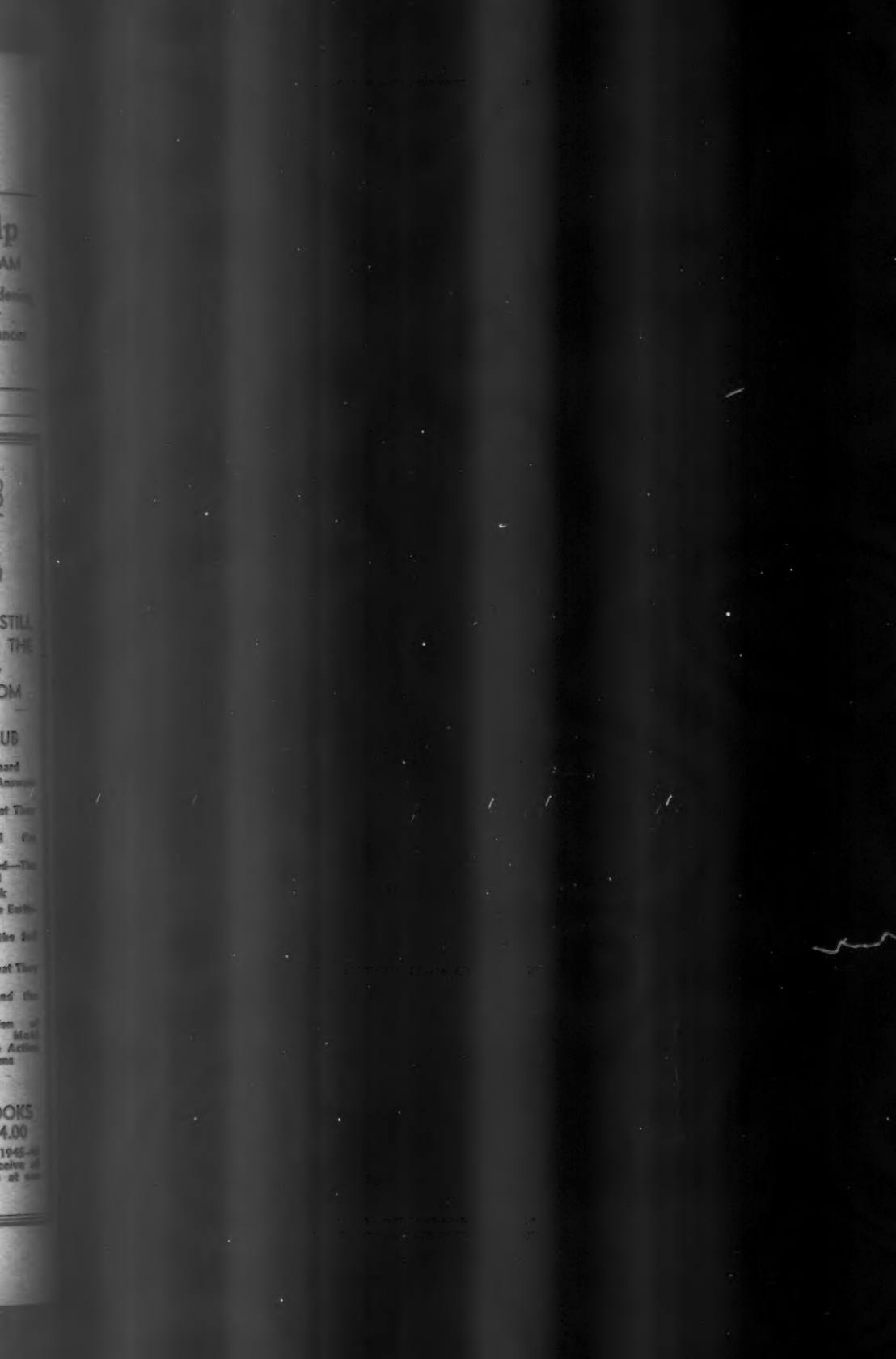

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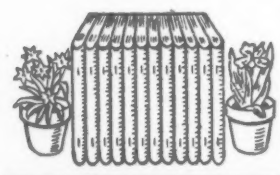

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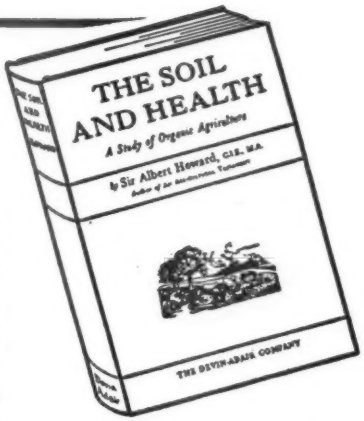

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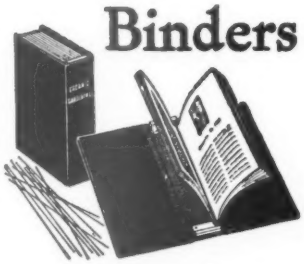

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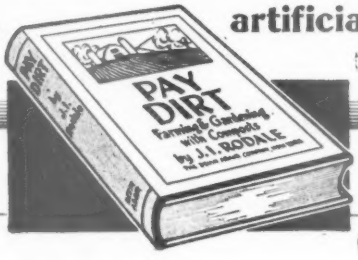

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